DEPARTMENT OF MATHEMATICS
COLLEGE OF SCIENCE
KING SAUD UNIVERSITY
M - 203 (DIFFERENTIAL AND INTEGRAL CALCULUS)
I MID-TERM EXAMINATION (II SEMESTER 1447/1448, 2025/2026
Time: 90 Minutes Max. Marks: 25

Note: All questions carry equal marks.

YOU ARE NOT ALLOWED TO USE CALCULATOR

Q#1) Determine whether the sequence $\{(\frac{n+2}{n+3})^n\}_{n=1}^{\infty}$ converges or diverges and if, it converges, find its limit.

Q#2) Test the convergence or divergence of the series

$$\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}\ln(n+1)}.$$

Q#3) Determine whether the following series

$$\sum_{n=0}^{\infty} \frac{5^n-3^n}{2^n}$$

converges or diverges.

Q#4) Find the interval of convergence and the radius of convergence for the power series

$$\sum_{n=0}^{\infty} \frac{(2x-3)^n}{4^n}.$$

Q#5) Find the Maclaurin series for the function $f(x) = \cos x$ and use it to approximate the integral

$$\int_0^1 \frac{1-\cos x}{x^2}dx$$

by using the first three non-zero terms.